

# The Impact of Commissions on Home Sales in Greater Boston

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Buying or selling a residential property is one of the most important financial decisions for a large majority of households in the United States. In 2007, 68 percent of households owned their own home, more than a third of national wealth was held in residential real estate, and there were 6.4 million sales of existing homes according to estimates from the Department of Housing and Urban Development.

Surveys indicate that an overwhelming majority of homes are sold with the aid of a licensed real estate agent or broker.<sup>1</sup> According to a report issued in 1983 in the wake of the Federal Trade Commission's investigation of the real estate brokerage industry, brokers accounted for the sale of 81 percent of single family homes. The National Association of Realtors (NAR), the largest professional organization of real estate agents in the United States that represents more than half of all licensed agents, estimates that nationally almost 80 percent of residential real estate transactions involve a Realtor.<sup>2</sup>

For owners selling their homes this way, real estate agents usually bear a large fraction of the costs of marketing a home: advertising the home, conducting open houses, taking potential buyers on visits to the home, and negotiating offers. Households interested in buying a home often solicit the help of an agent to make appointments to visit properties and arrange financing. In exchange for their efforts, agents are usually compensated with a fixed percentage commission of the sales price, split between the buyer's agent and the seller's agent (National Association of Realtors 2007, Chang-Tai Hsieh and Enrico Moretti 2003). If the agents are working for

a firm, they may also give it a portion of their commissions.

Some researchers have examined incentive issues between brokers and their clients<sup>3</sup> and the entry of real estate agents across cities.<sup>4</sup> There are also studies on the effects of alternate selling mechanisms such as For-Sale-By-Owner and flat-fee commissions.<sup>5</sup> In Greater Boston, a percentage commission arrangement constitutes the overwhelming majority of transactions in our sample, and the associated costs are substantial. The median house sold for about \$505,000 in 2007 dollars (adjusted using the Northeast region urban consumer price index from the Bureau of Labor Statistics), while the most common commission for the buyer's agent is 2.5 percent. If the seller's agent earns the same amount, then the total commission for a typical property is \$25,250, which represents a large fraction of the average income in the Boston metropolitan statistical area. Given the sizable transaction costs associated with selling a property, we investigate whether sellers who pay higher commissions experience different sales outcomes.

## I. Data

The data is from the online Multiple Listing Service (MLS) network for the Boston area. We collected information on all listed nonrental residential properties within a 15-mile radius of downtown Boston from 1998 to 2007. The data include property characteristics such as address and zip code, the number of bedrooms, bathrooms, and other rooms, the number of garages, age, square footage, lot size, style, garden, heating, property type (condominium, single family or multifamily), the listed date and price, and, if

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<sup>1</sup> While a real estate broker usually supervises an agent, often as the owner of the firm, and is subject to more stringent licensing requirements, we use the terms agent and broker interchangeably.

<sup>2</sup> National Association of Realtors. 2007. *Member Profile*

<sup>3</sup> See, e.g., Ron Rotherford, Thomas Springer, and Abdullah Yavas (2005); Steven Levitt and Chad Syverson (2008a).

<sup>4</sup> See, e.g., Hsieh and Moretti (2003); Lu Han and Seung-Hyun Hong (2008).

<sup>5</sup> See, e.g., Igal Hendel, Aviv Nevo, and Francois Ortalo-Magne (2009); Levitt and Syverson (2008b).

sold, the number of days on the market and the sale price.<sup>6</sup> Each entry also contains the name of the listing agent as well as the firm he/she works for. We exclude observations with missing cities and listing agents. We also drop the most expensive one percent of properties.<sup>7</sup>

Although there are no statistics on the exact percentage of real estate transactions that are listed on the MLS, there is strong evidence that it is considerable. The Warren Group is a commercial data vendor which collects information about changes in home ownership from the deeds office of towns in the Boston area. It is worth noting that their data include various nonmarket transactions and should be larger than the MLS sample. Using their data for a majority of our cities, we found that the number of completed transactions in the MLS dataset was approximately 70 percent of the total number of changes in home ownership recorded, except for the city of Boston. Although this figure is based on transaction counts rather than matching the deeds data with the MLS data, it is similar to other available estimates (FTC 1983). The coverage for Boston is only about 50 percent, which may be due to a lower fraction of MLS-facilitated sales and issues related to the geographical match. As a result, we exclude properties in Boston from our sample, though this has little impact on the estimates we report below.

The data also record commissions offered to the buyer's agent. Unfortunately, commissions offered to the seller's agent are not available from the MLS, and neither are kickbacks or rebates. In the analysis below, we focus on buyer's agent gross commissions. Based on conversations with numerous Realtors, the total commission is often split evenly between the seller's agent and the buyer's agent. When there is no buyer's agent, the seller's agent usually receives the entire commission. For our study, the buyer's agent commission, multiplied by two, serves as our approximation of the cost of intermediation paid by the seller.<sup>8</sup> We exclude listings with missing commissions,

flat-fee contracts, and other nonpercentage commissions.<sup>9</sup> In total, there are 261,661 observations in our dataset.

For about 85 percent of listings in our sample, the buyer's agent commission is 2.0 percent (low) or 2.5 percent (high). If the total commission is twice this amount, then half of our observations have a five percent commission and more than a third have a four percent commission. There is little variation in commissions over time despite the increased penetration of the Internet and new technologies. A sizable portion of the variation can be explained by the listing office and the zip code of the property. Among the largest firms, commissions are higher for Coldwell Banker, DeWolfe, and Hammond, and lower for Century 21 and RE/MAX. Towns with lower income levels, such as Lynn and Quincy, tend to have a mean commission closer to 2.0 percent, while more affluent towns, such as Newton and Wellesley, have rates closer to 2.5 percent.

In Table 1, we report house characteristics by the two most common commission levels for each property type. On average, a condominium has two bedrooms and one and a half bathrooms. A single family home has approximately three and a half bedrooms and two bathrooms, while a multifamily home has more than five bedrooms and close to three bathrooms. These characteristics differ somewhat for high and low commission properties. Since wealthier towns tend to have higher commissions, column 3 reports differences in property characteristics adjusted for month and zip code-year interactions. High commission condominiums have slightly fewer bedrooms, more bathrooms and fewer other rooms conditional on time and neighborhood. High commission single family and multifamily homes have fewer bedrooms and bathrooms. While some of these differences are statistically significant, they are relatively small. High commission properties are also more likely to be condominiums and less likely to be multifamily homes. Specifically, condominiums comprise 34 percent of properties with high commissions, but only 27 percent of properties with low commissions. The figures for multifamily homes are nine percent and 18 percent, respectively.

<sup>6</sup> For sold properties, the number of days on the market is measured by the difference between the listing date and the date the property is taken off the MLS database.

<sup>7</sup> The average sold price of the most expensive one percent of properties is \$2.75 million in 2007 dollars.

<sup>8</sup> In the early part of our sample, we sometimes see a commission level for a subagent, an agent who represents the seller but attracts buyers to the property. When a buyer's agent commission is missing, we fill in the subagent

commission, but this affects less than 0.2 percent of our observations.

<sup>9</sup> This restriction eliminates 11,766 listings from our sample.

TABLE 1—SUMMARY STATISTICS

	Characteristics by buyer's commission (BAC)		Zip-year adjusted difference (high–low) (3)
	Low (BAC=2.0) (1)	High (BAC=2.5) (2)	
Condominium	0.27	0.34	
Number of bedrooms	2.05 (0.75)	2.14 (0.81)	–0.024** (0.008)
Number of bathrooms	1.53 (0.62)	1.62 (0.68)	0.026** (0.006)
Number of other rooms	1.16 (0.80)	1.20 (0.87)	–0.025** (0.008)
Single family	0.55	0.57	
Number of bedrooms	3.40 (0.92)	3.57 (0.99)	–0.061** (0.007)
Number of bathrooms	1.86 (0.80)	2.17 (0.97)	–0.061** (0.006)
Number of other rooms	1.93 (1.03)	1.83 (1.03)	–0.007 (0.008)
Multi family	0.18	0.09	
Number of bedrooms	5.67 (1.78)	5.39 (1.65)	–0.181** (0.025)
Number of bathrooms	2.71 (0.87)	2.69 (0.88)	–0.030* (0.013)
Number of other rooms	3.61 (1.54)	3.64 (1.59)	0.031 (0.030)
Observations	91,198	135,706	

*Notes:* The data cover 226,904 out of 261,661 MLS listings from January 1998–December 2007 for Greater Boston where the buyer's agent commission (BAC) is either 2.0 or 2.5. BAC is 2.0 in column 1 and 2.5 in column 2. Column 3 reports house characteristic contrasts adjusting for month and zip-year. Robust standard errors in parentheses.

\*\*Significant at the 5 percent level.

\*Significant at the 10 percent level.

## II. Impact of Commissions

Real estate agents provide different services in exchange for their commissions. Our data allow us to measure their impact on three outcomes: whether a listed property is sold or not and, if sold, the number of days on the market and the sales price.

Let  $y_{ijt}$  be a measure of the sales outcome for property  $i$  in zip code  $j$  in year  $t$ , and let  $C_i$  be the buyer's agent commission. Our empirical strategy is to estimate versions of the following equation:

$$(1) \quad y_{ijt} = \alpha_m + \gamma_{jt} + \beta'X_i + \lambda C_i + \epsilon_{ijt},$$

where  $\alpha_m$  are month indicators,  $\gamma_{jt}$  are zip code–year interactions,  $X_i$  are property characteristics, and  $\epsilon_{ijt}$  reflects unobservables. The property characteristics include all house attributes in the MLS database listed above, with indicators for missing values. We allow coefficients of the property characteristics to differ by property type. We also treat the number of bedrooms, bathrooms and other rooms as categorical variables, though in practice this choice matters little.

The coefficient of interest is  $\lambda$ . If  $C_i$  were randomly assigned, ordinary least squares estimates of equation (1) would provide the average causal effect of commissions on sales outcomes. However, the results in Table 1 suggest that

properties with high commissions may differ from those with low commissions based on their observed characteristics. To account for these differences, we report estimates with and without property characteristics. Even though there is still a concern that houses with different commission levels may differ in unobserved ways, the rich set of controls we include are a step closer towards measuring the true causal effect of commissions on sales outcomes.

In Table 2, we consider whether properties with higher commissions are more likely to sell. Column 1 includes only month and zip code-year interactions, while column 2 also includes the full set of property characteristics. In the third column, we report the marginal effect from a probit model. These estimates imply that a house with a two percent buyer's agent commission is about 2.5 percentage points less likely to sell than a comparable house with a 2.5 percent commission.

About two-thirds of the listed properties in our dataset are eventually sold. For these properties, we investigate in Table 3 whether houses with lower commissions take longer to sell. Without any controls for property characteristics, going from a buyer's agent commission of 2.5 percent down to 2.0 percent lengthens the time on market by about half a day, a result that is marginally significant. However, the coefficient attenuates and becomes insignificant when we control for property characteristics. To investigate whether our estimates are driven by extreme values, in column 3 we report results using the log of days on the market. This transformation diminishes the influence of observations with large values. The estimate is significant, but small: a change in the buyer's agent commission from 2.0 percent to 2.5 percent reduces time on the market by about a day and a half. Relative to the average length of just over two months in our sample, this is a modest effect. On balance, higher commissions do not sizably reduce the time required to sell a property.

In Table 4, we examine the impact of commission on sales price. Without controlling for house attributes, higher commissions are associated with lower sales prices. The negative coefficient disappears once we add house characteristics, and the  $R^2$  increases from 0.46 to 0.86. This result implies that while a buyer's agent commission change from two percent to 2.5 percent increases the cost of selling a typical

TABLE 2—LIKELIHOOD OF SALE

	Probability of sale (1)	Probability of sale (2)	Marginal effect (probit) (3)
Buyer's agent commission	0.049*** (0.003)	0.044*** (0.002)	0.045*** (0.003)
$R^2$	0.102	0.124	0.101
Month and zip code-year fixed effects	Yes	Yes	Yes
House characteristics	No	Yes	Yes

Notes: Number of observations is 261,661. Each column is from a different specification. Only the coefficient on the buyer's agent commission is reported. Robust standard errors in parentheses. Columns 1 and 2 report estimates from a linear probability model, while column 3 reports the marginal effect from a probit and the corresponding pseudo- $R^2$ .

\*\*\*Significant at the 1 percent level.

home by \$5,050, it does not impact the price at which the home sells.

To investigate the robustness of this result, we have explored the relationship between commissions and sales price along three dimensions. First, to check whether our result is driven by high priced properties, we estimate the specification in column 2 excluding properties whose price is greater than the ninety-fifth percentile of all transactions. We continue to find that commissions have no impact on sales prices. Next, we estimate the model for each year separately. The coefficient on commissions moves together with overall house price levels, though it is imprecisely estimated for most years. Finally, we estimate the equation for each city. Most of our estimates are insignificant, and the significant coefficients are more likely negative than positive.

We cannot rule out the possibility that negative unobserved house attributes are correlated with commissions and bias our results towards zero. However, one might expect that such unobserved house attributes would also lead to a lower probability of sale, contrary to our findings above. Moreover, the high  $R^2$  of our regressions indicate that our extensive list of covariates might be providing adequate control.

TABLE 3—IMPACT OF COMMISSIONS ON TOTAL DAYS ON MARKET, CONDITIONAL ON SALE

	Days on market (1)	Days on market (2)	log(Days on market) (3)
Buyer's agent commission	-1.12** (0.54)	-1.02 (0.53)	-0.045*** (0.009)
R <sup>2</sup>	0.107	0.161	0.148
Month and zip code-year fixed effects	Yes	Yes	Yes
House characteristics	No	Yes	Yes

Notes: Number of observations is 179,386. Each column is from a different specification. Robust standard errors in parentheses.

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

### III. Concluding Comments

This paper has examined the impact of commissions on the likelihood that a property sells, the amount of time it takes to sell, and the sales price for a large set of properties in Greater Boston. A higher commission is associated with a higher likelihood of sale, a modest impact on the days on the market and overall no effect on the sales price. It is possible that high commission agents realize lower sales prices to increase the likelihood of selling a property. This result would be consistent with agents not fully internalizing the interests of sellers, with high commission agents benefitting more from completing sales relative to obtaining higher prices for their clients.

In the current real estate brokerage industry, prices that agents charge their clients may not be a signal of quality since commissions do not appear to be informative of the agent's impact on days on the market or the sales price. These results raise the question of how home sellers and buyers match with agents and each other, and the overall value of intermediation. We hope to investigate these issues further in subsequent work.

### REFERENCES

**Federal Trade Commission.** 1983. *The Residential Real Estate Brokerage Industry: Los Angeles*

TABLE 4—IMPACT OF COMMISSIONS ON SALES PRICE, CONDITIONAL ON SALE

	log(sales price) (1)	log(sales price) (2)
Buyer's agent commission	-0.033*** (0.003)	0.000 (0.001)
R <sup>2</sup>	0.459	0.861
Month and zip code-year fixed effects	Yes	Yes
House characteristics	No	Yes

Notes: Number of observations is 179,386. Each column is from a different specification. Robust standard errors in parentheses.

\*\*\*Significant at the 1 percent level.

*Regional Office Staff Report.* Washington, DC: US Government Printing Office.

**Han, Lu, and Seung-Hyun Hong.** 2008. "Testing Cost Inefficiency under Free Entry in the Real Estate Brokerage Industry." Unpublished.

**Hendel, Igal, Aviv Nevo, and Francois Ortal-Magne.** 2009. "The Relative Performance of Real Estate Marketing Platforms: MLS Versus FSBOMadison.com." *American Economic Review*, 99(5): 1878–98.

**Hsieh, Chang-Tai, and Enrico Moretti.** 2003. "Can Free Entry Be Inefficient? Fixed Commissions and Social Waste in the Real Estate Industry." *Journal of Political Economy*, 111(5): 1076–122.

**Levitt, Steven D., and Chad Syverson.** 2008a. "Antitrust Implications of Outcomes When Home Sellers Use Flat-Fee Real Estate Agents." In *Brookings-Wharton Papers on Urban Affairs 2008*, ed. Gary Burtless and Janet Rothenberg Pack, 47–88 and 92–3.

**Levitt, Steven D., and Chad Syverson.** 2008b. "Market Distortions When Agents Are Better Informed: The Value of Information in Real Estate Transactions." *Review of Economics and Statistics*, 90(4): 599–611.

**Rutherford, Ronald C., Thomas M. Springer, and Abdullah Yavas.** 2005. "Conflicts between Principals and Agents: Evidence from Residential Brokerage." *Journal of Financial Economics*, 76(3): 627–65.